

FIG. 1

BEST AVAILABLE COPY

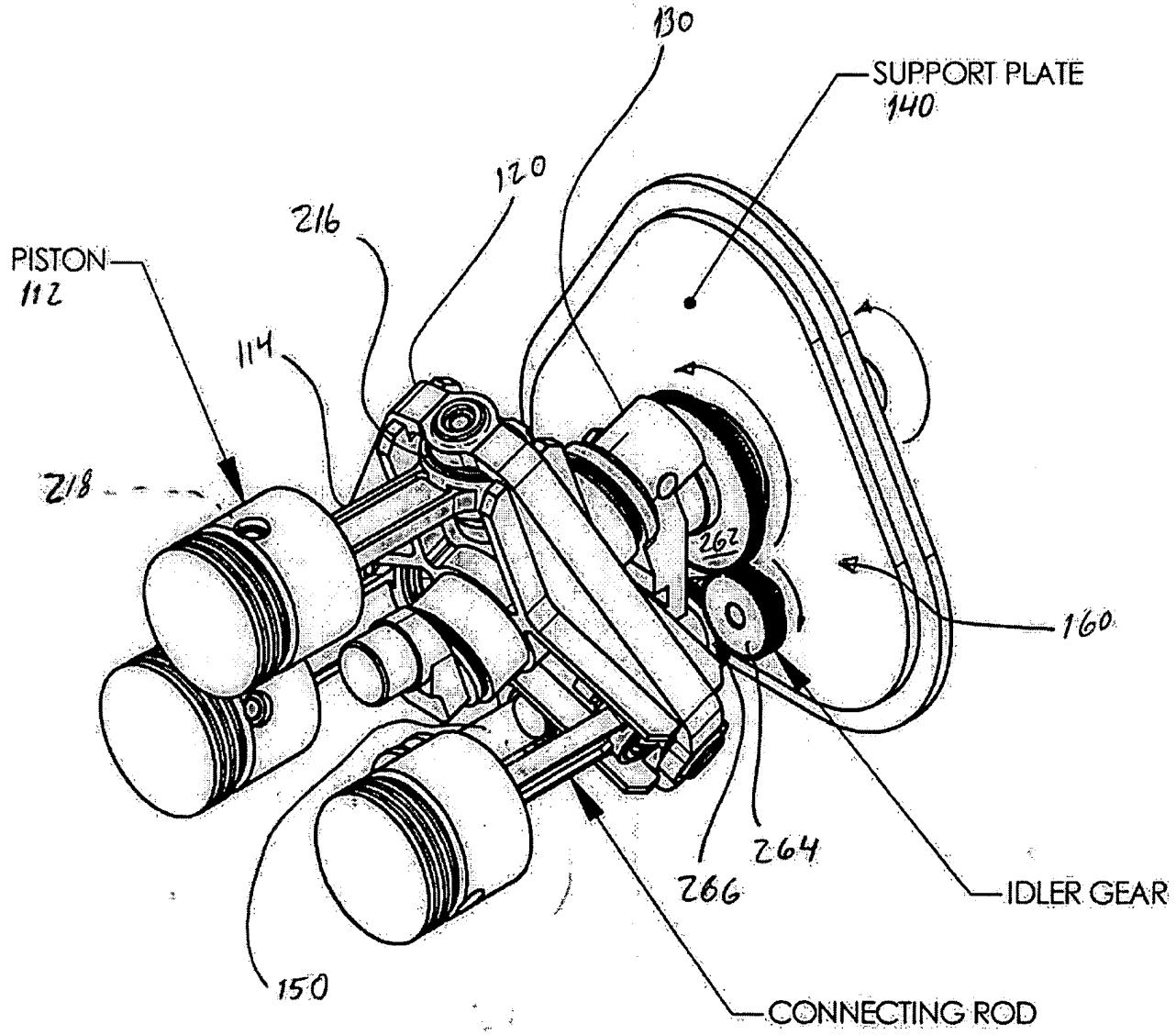


FIG 2

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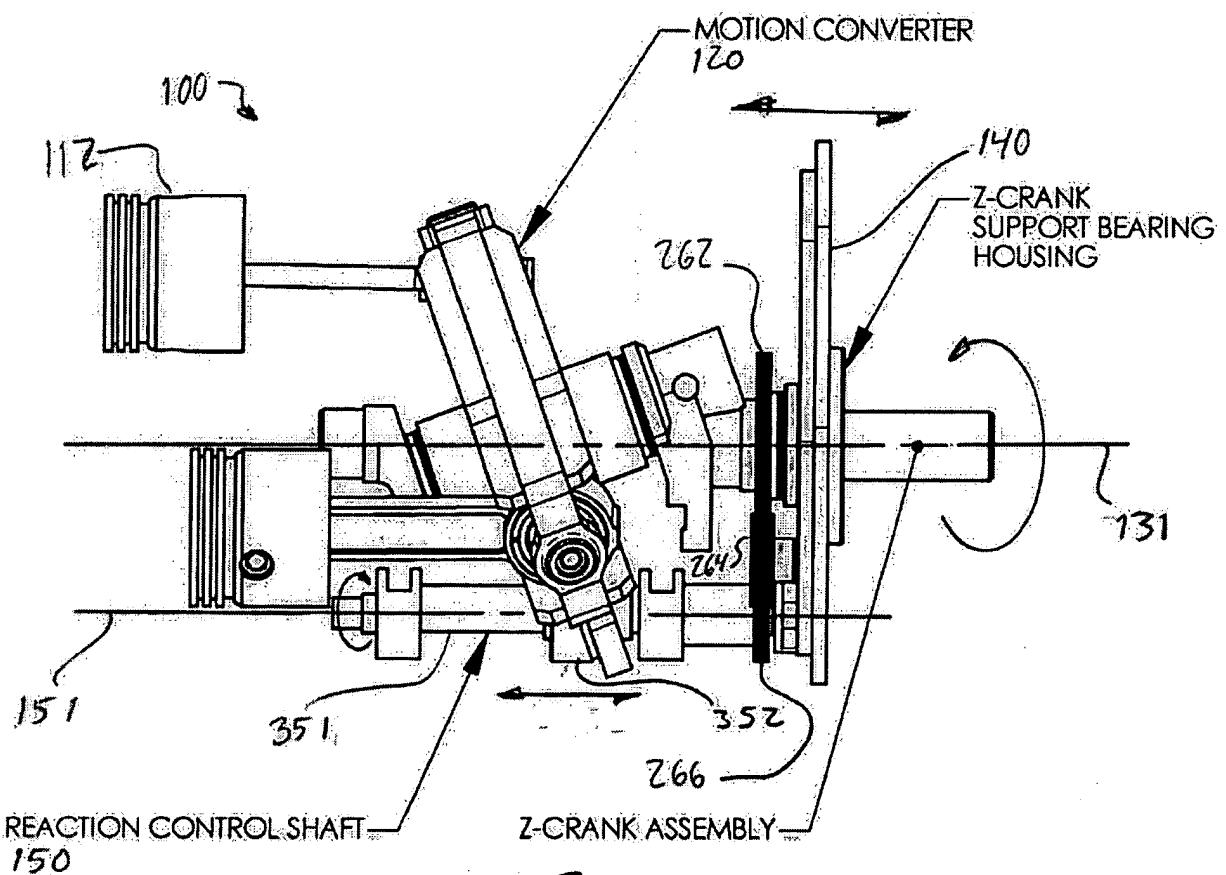
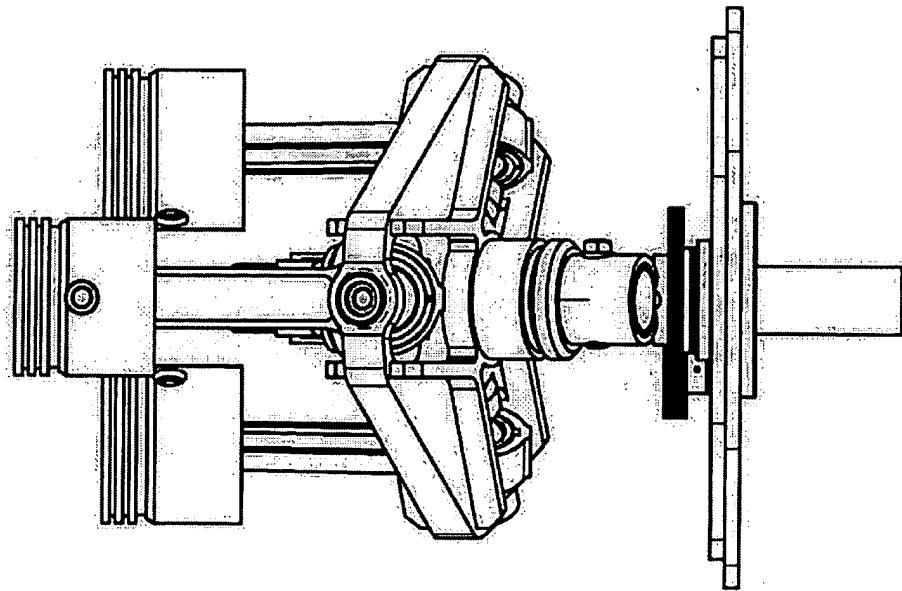


FIG 3

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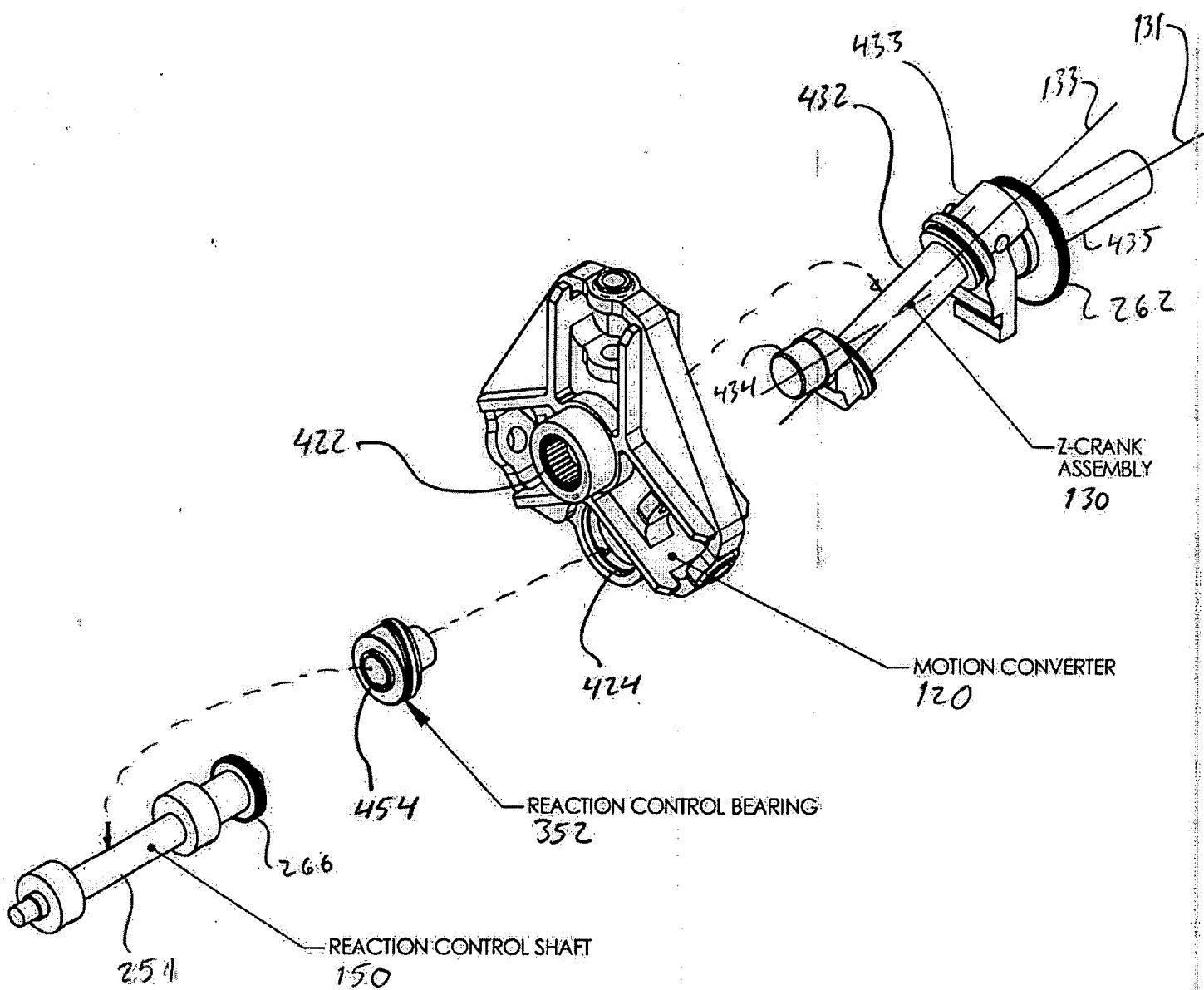


FIG. 4

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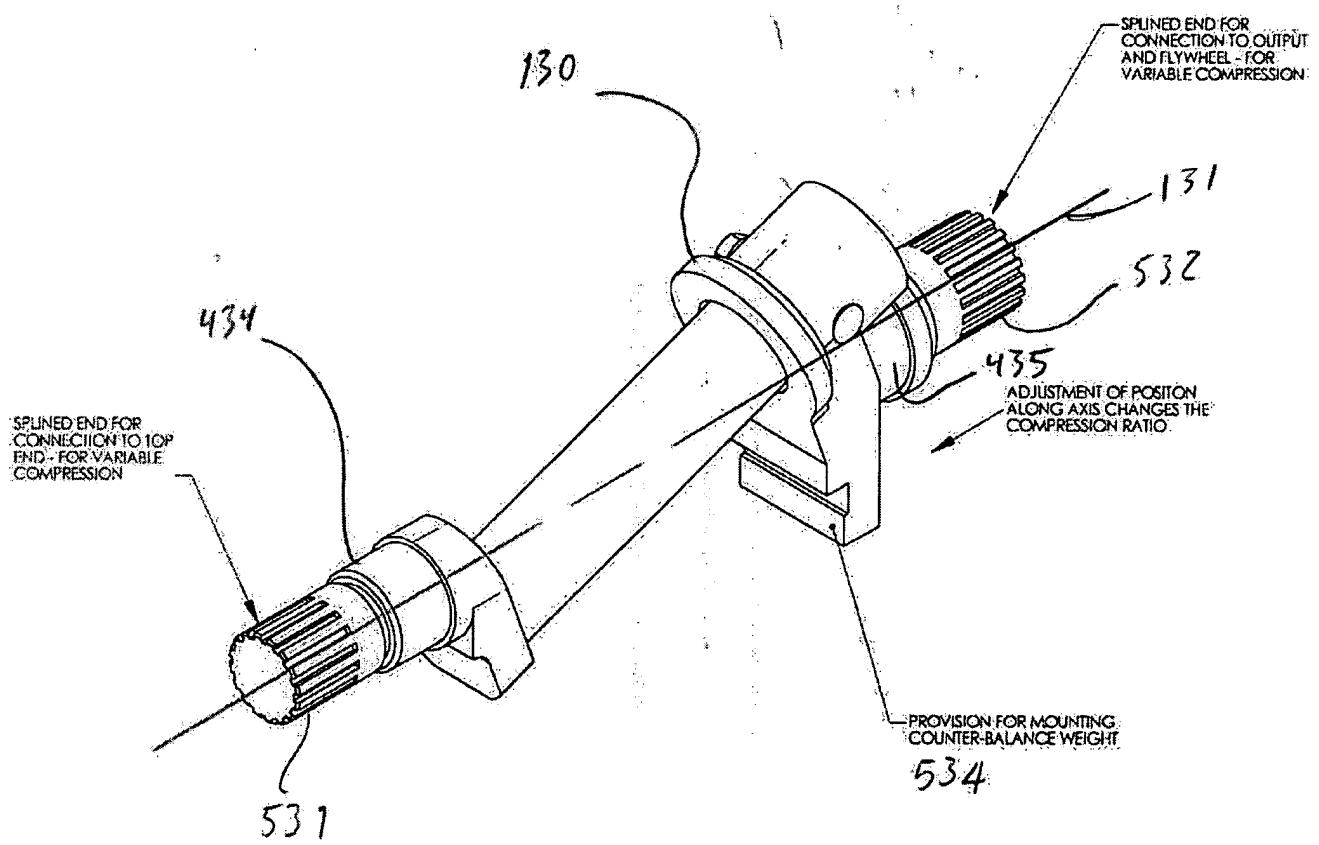


FIG. 5

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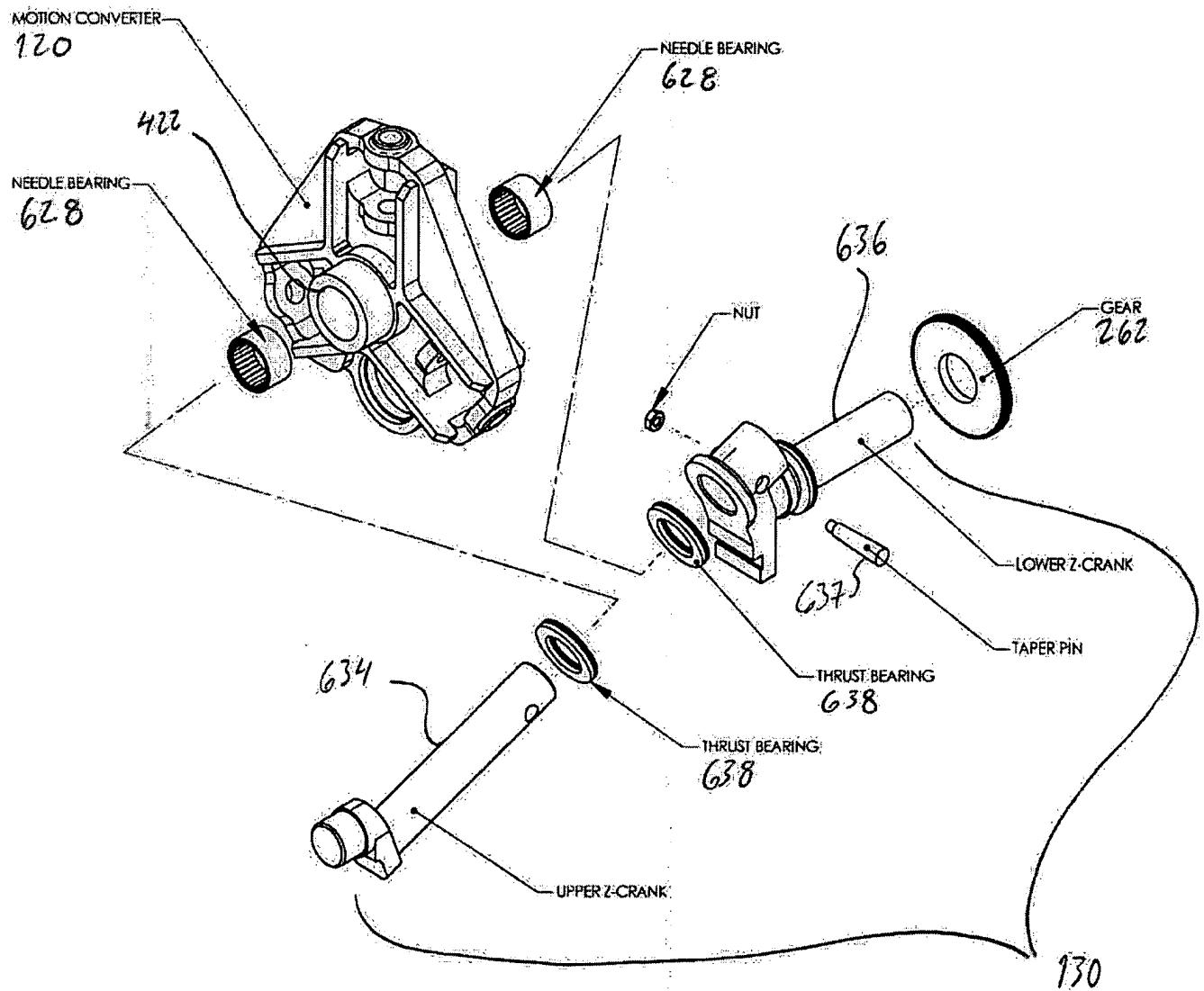


FIG 6

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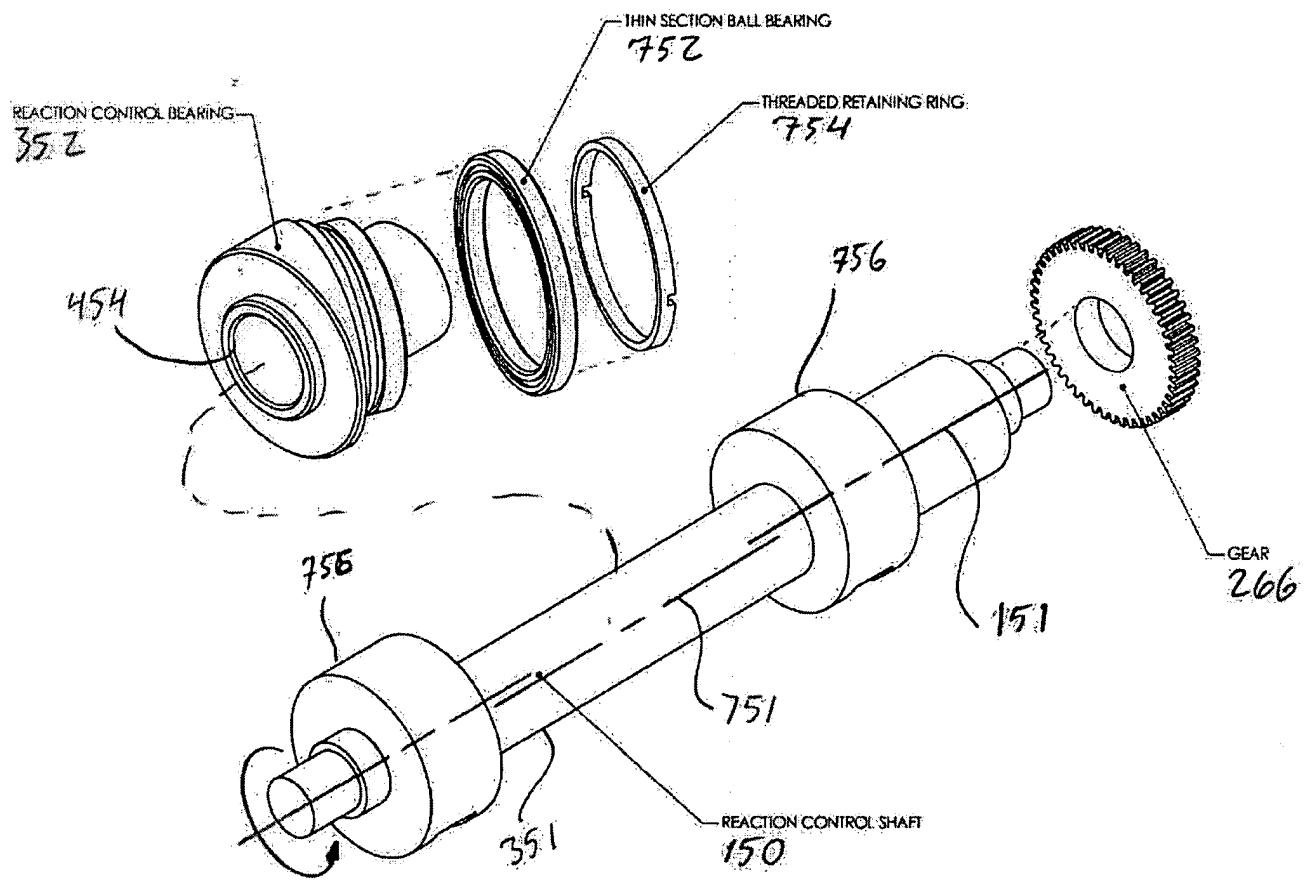


FIG 7

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Z-CRANK WITH
GEARED REACTION
CONTROL MECHANISM

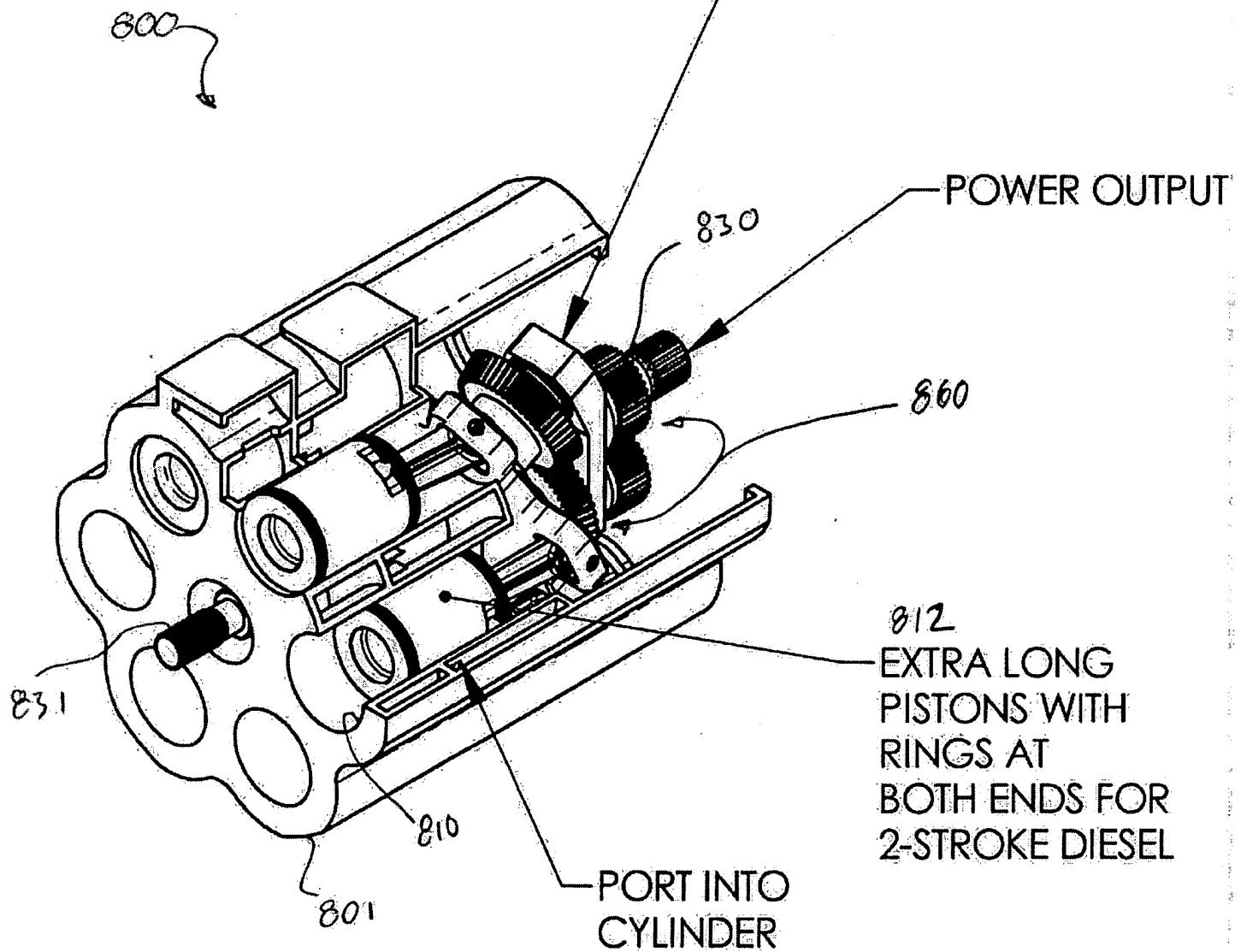


FIG. 8

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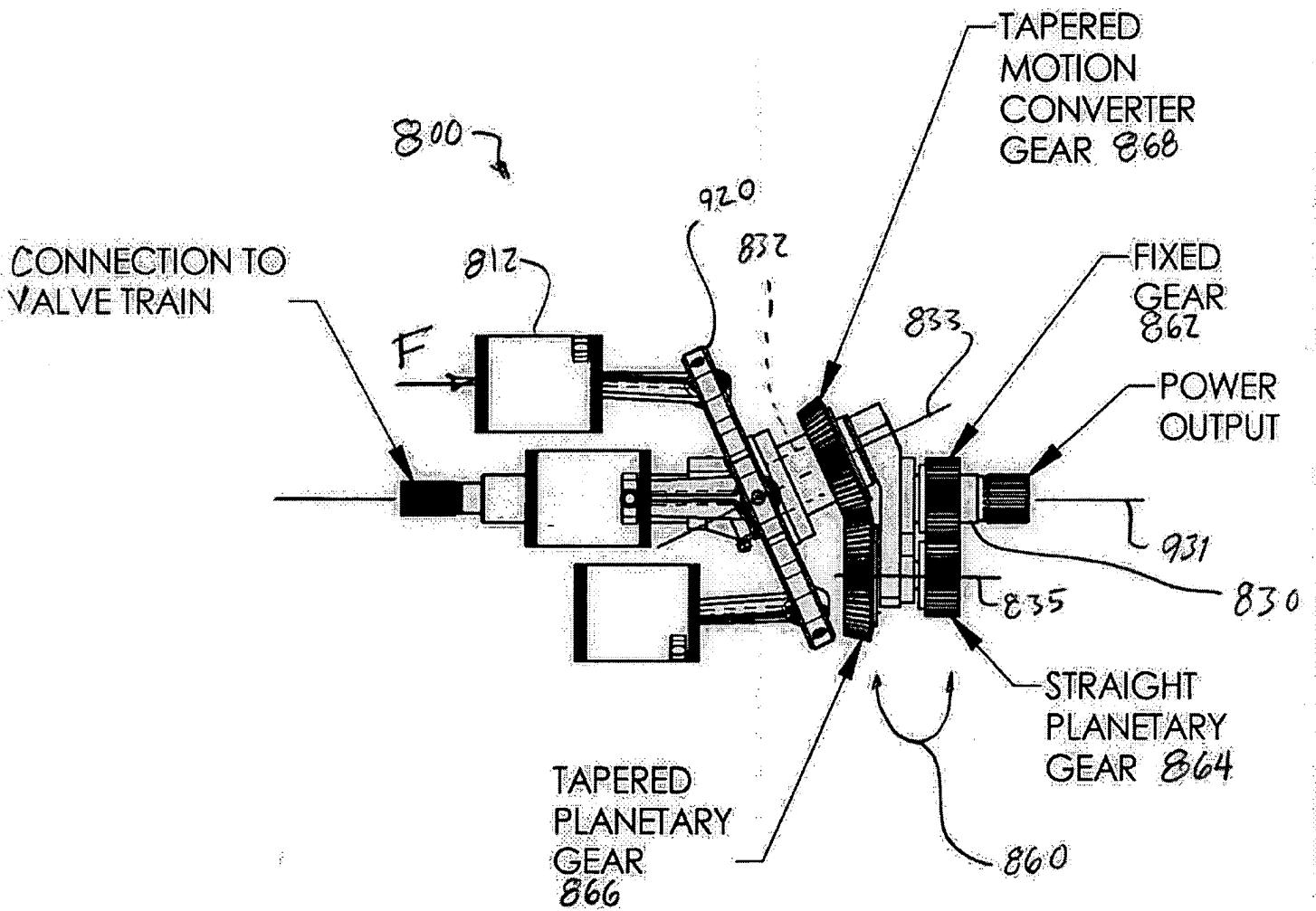


FIG. 9

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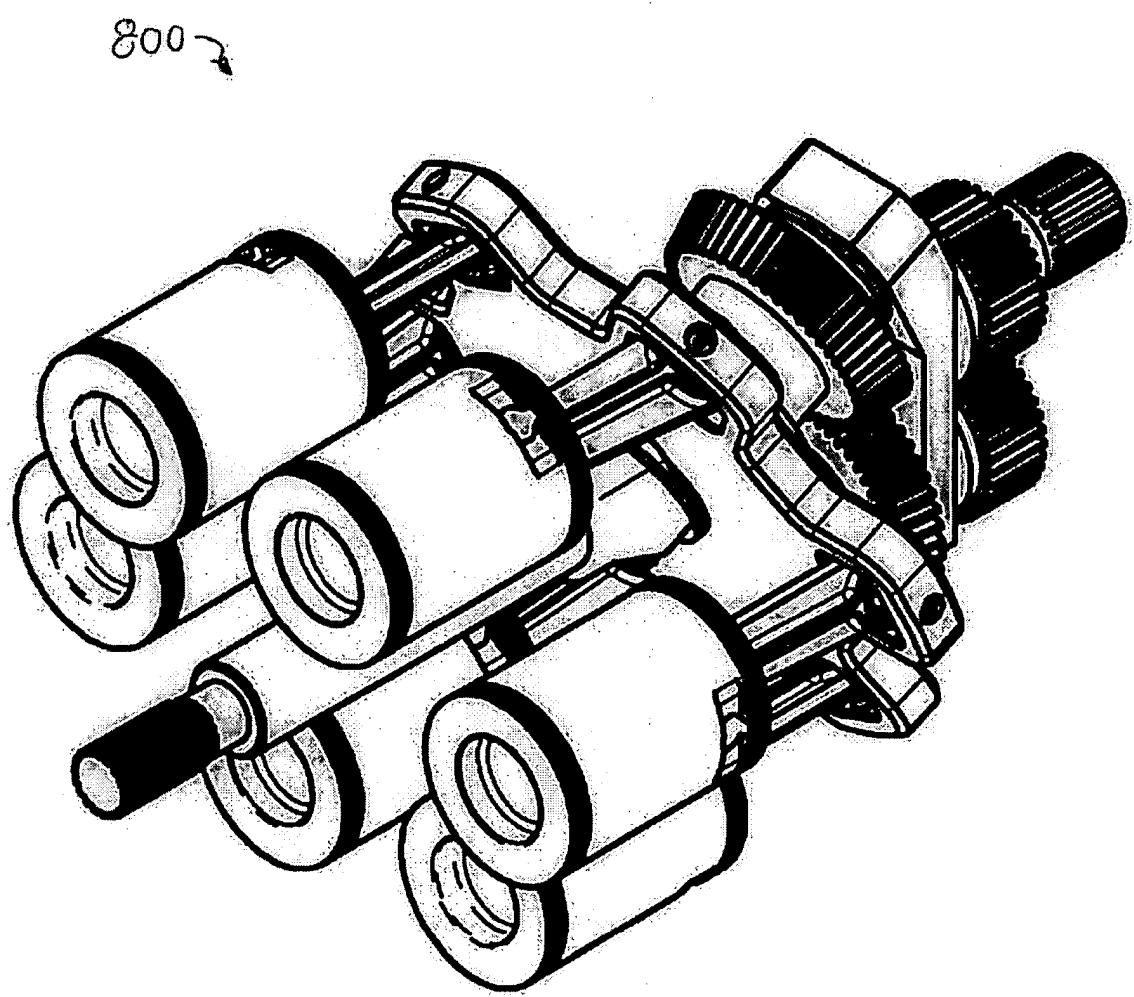


FIG 10

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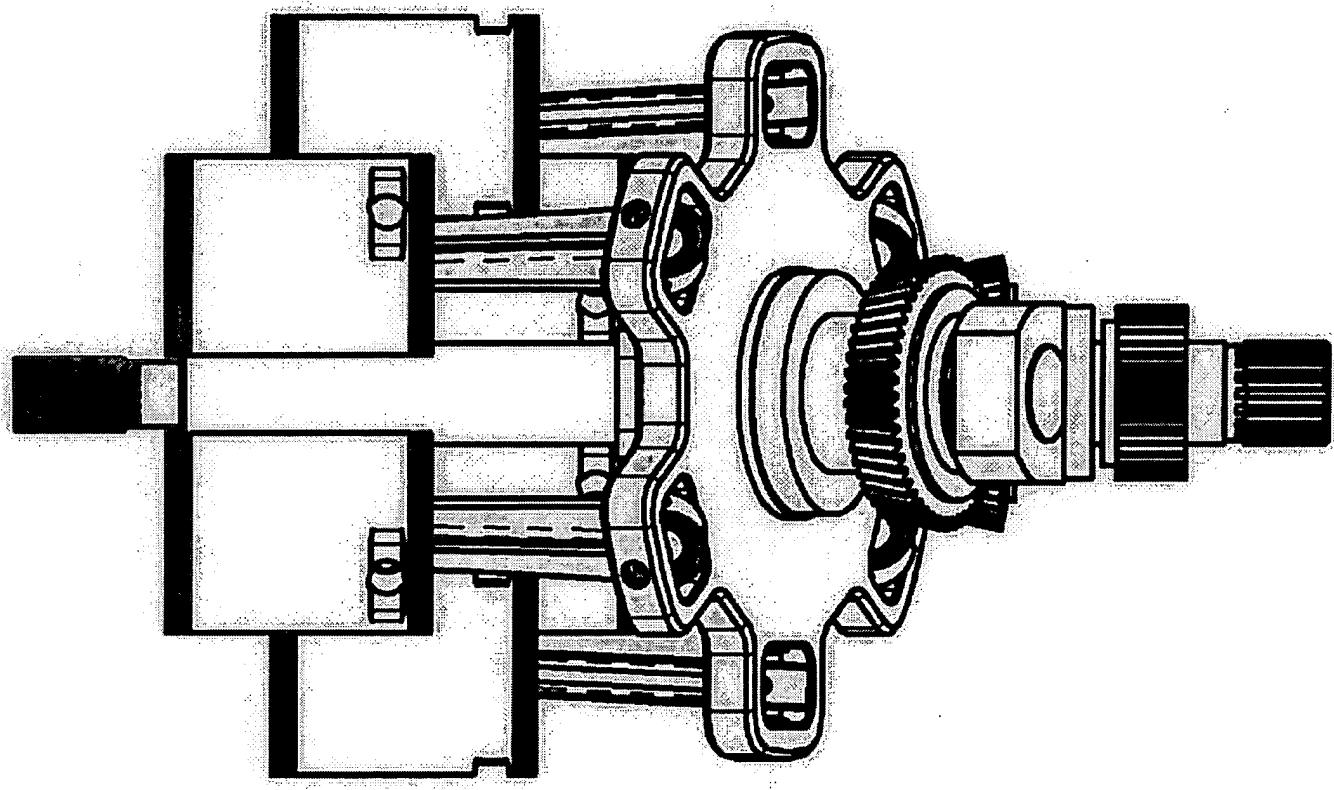


FIG 11

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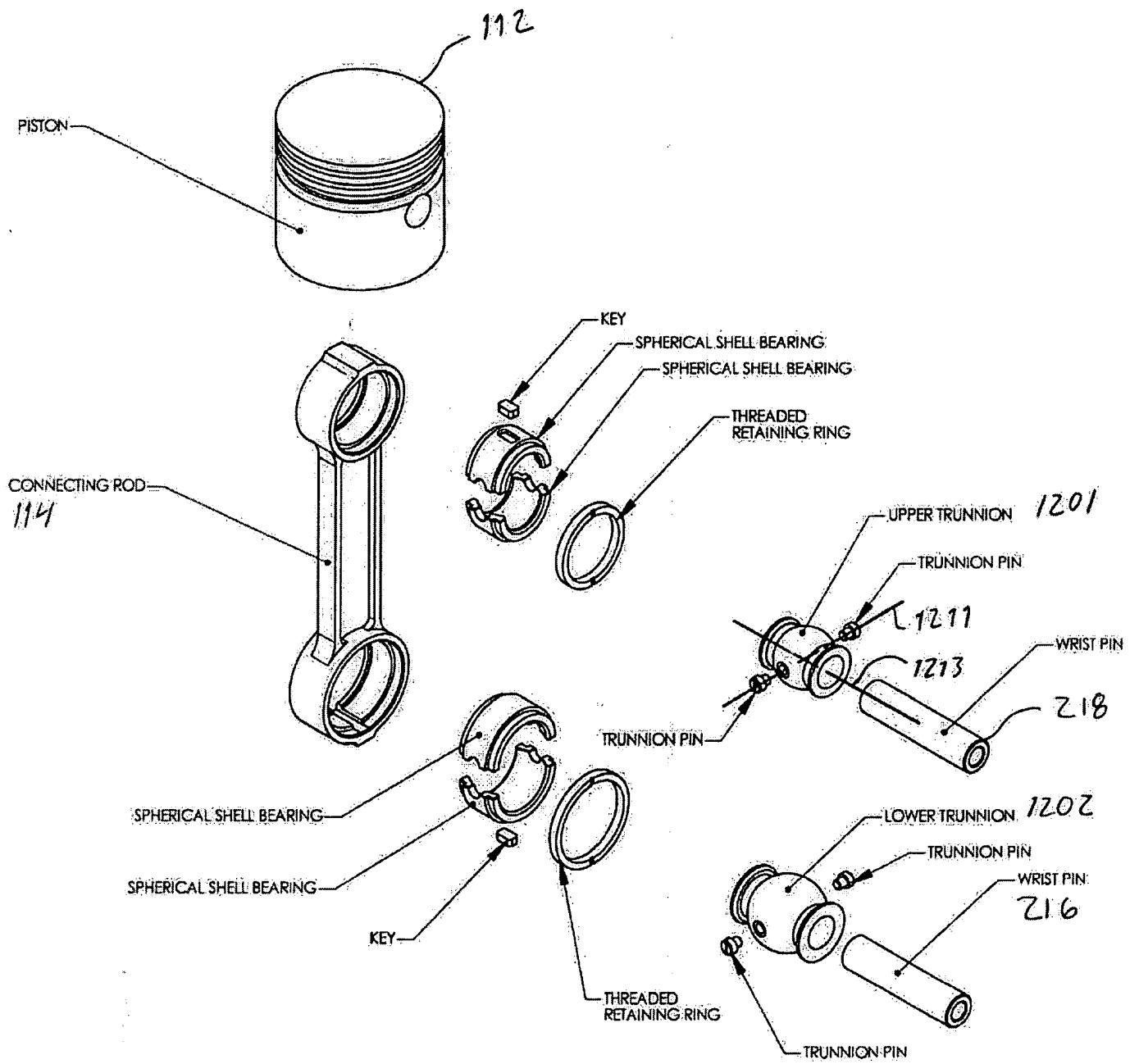
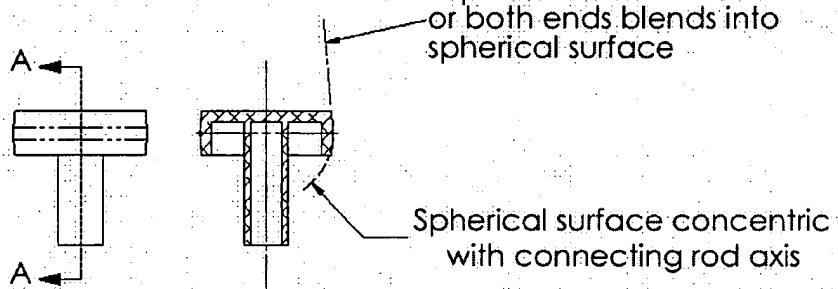
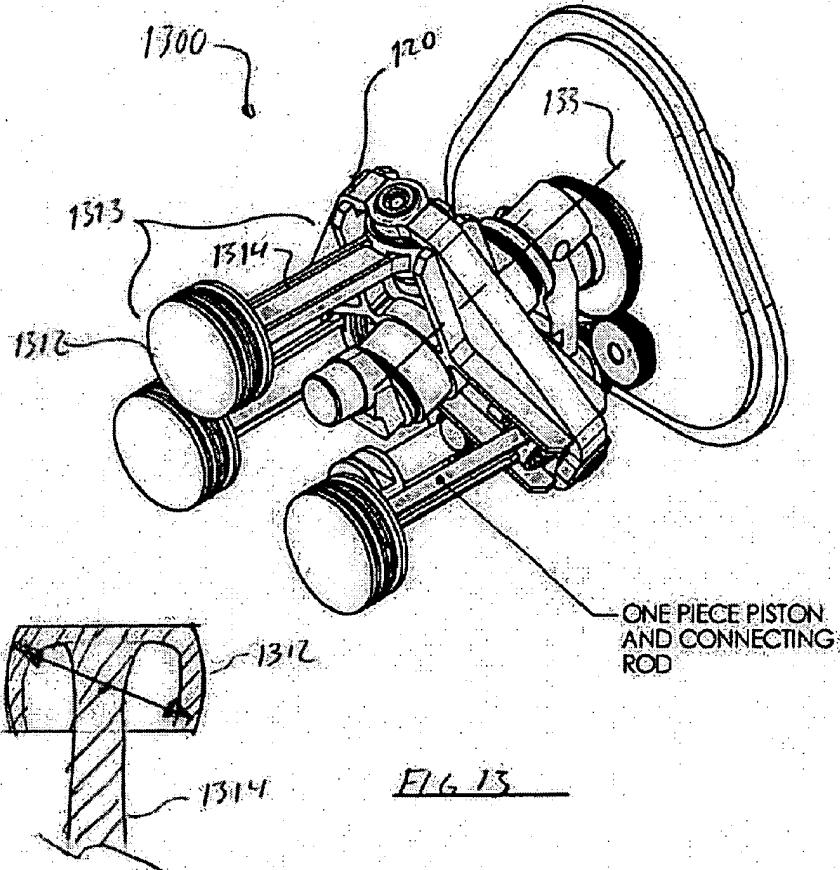


FIG 12

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Note: grooves for piston rings omitted for clarity

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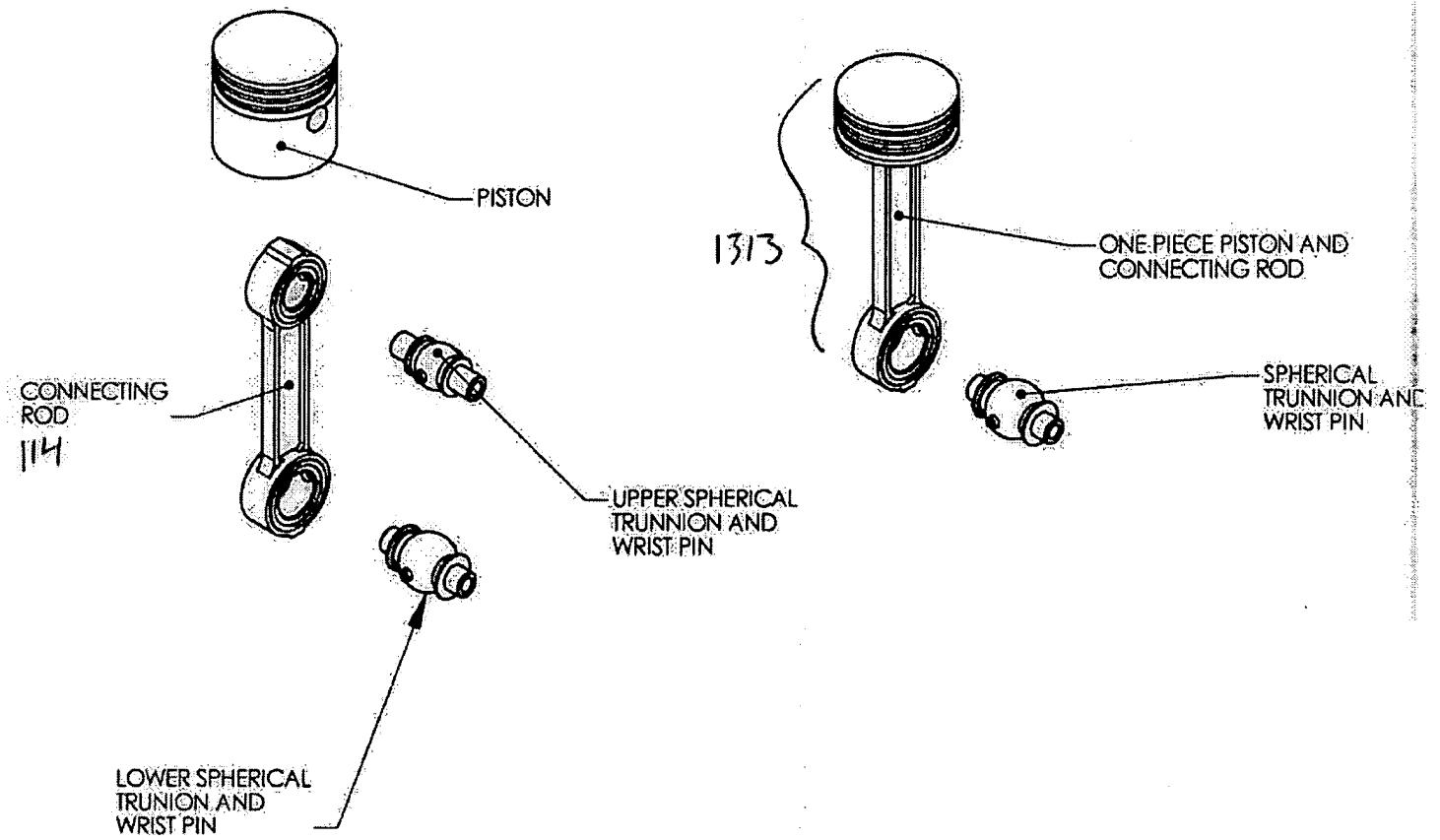


FIG 14

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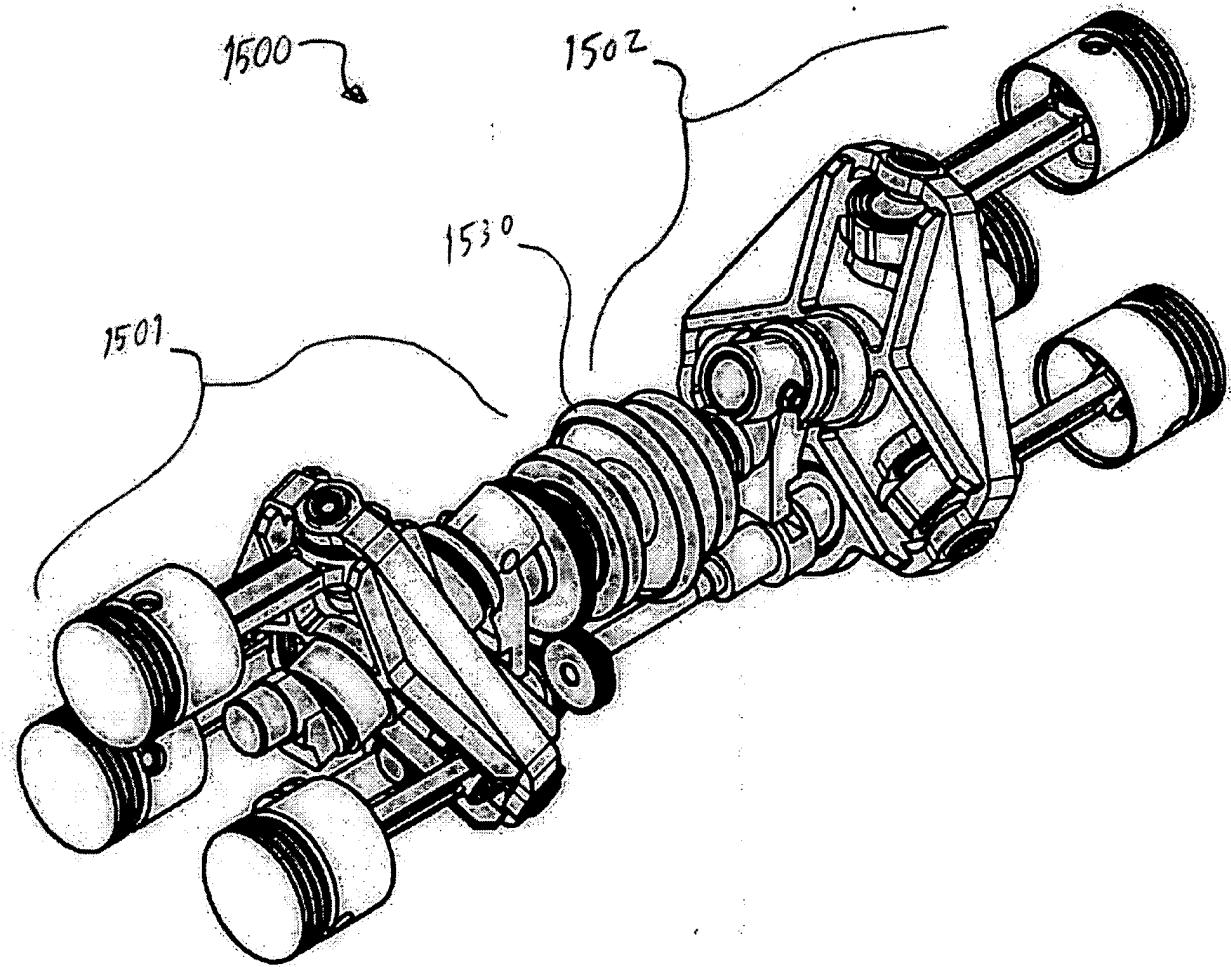
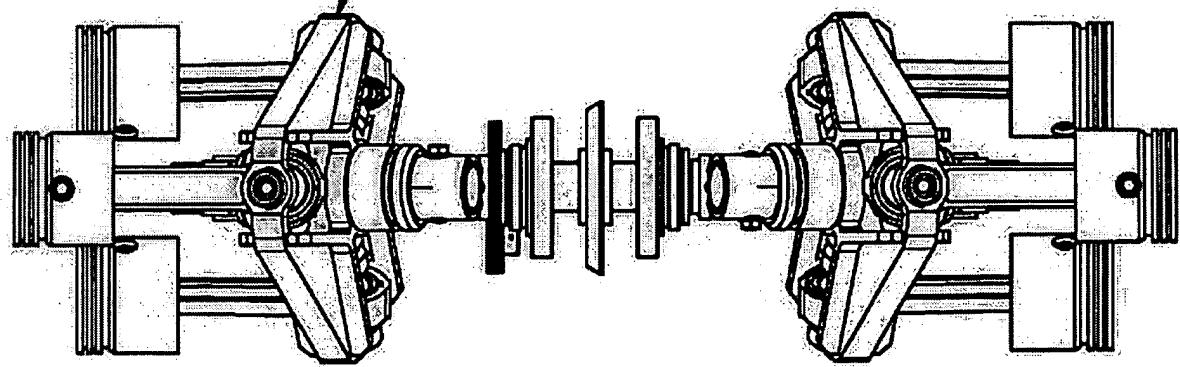


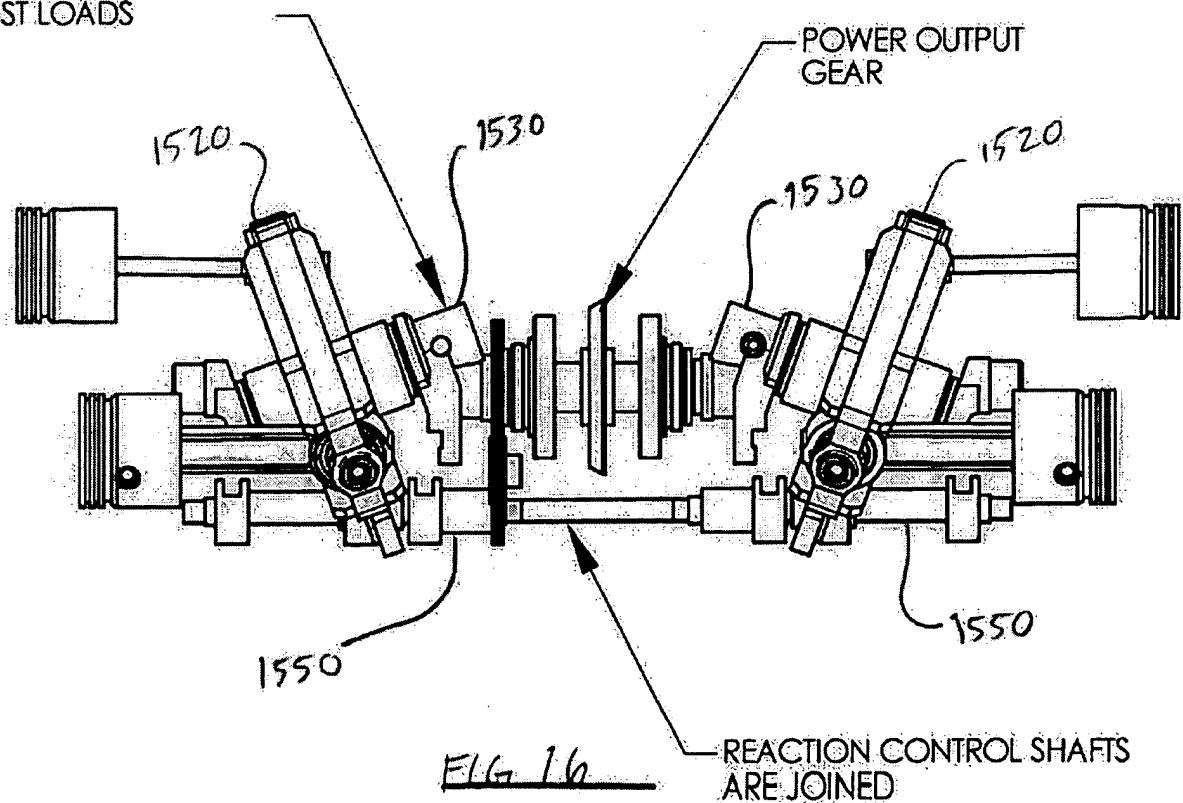
FIG 15

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OPPOSED MOTION
CONVERTERS ARE IN
PHASE FOR 4-STROKE
ENGINES AND OUT OF
PHASE FOR 2-STROKE AND
COMPRESSOR APPLICATIONS



DUAL Z-CRANK CARRIES
OPPOSED PISTON
THRUST LOADS



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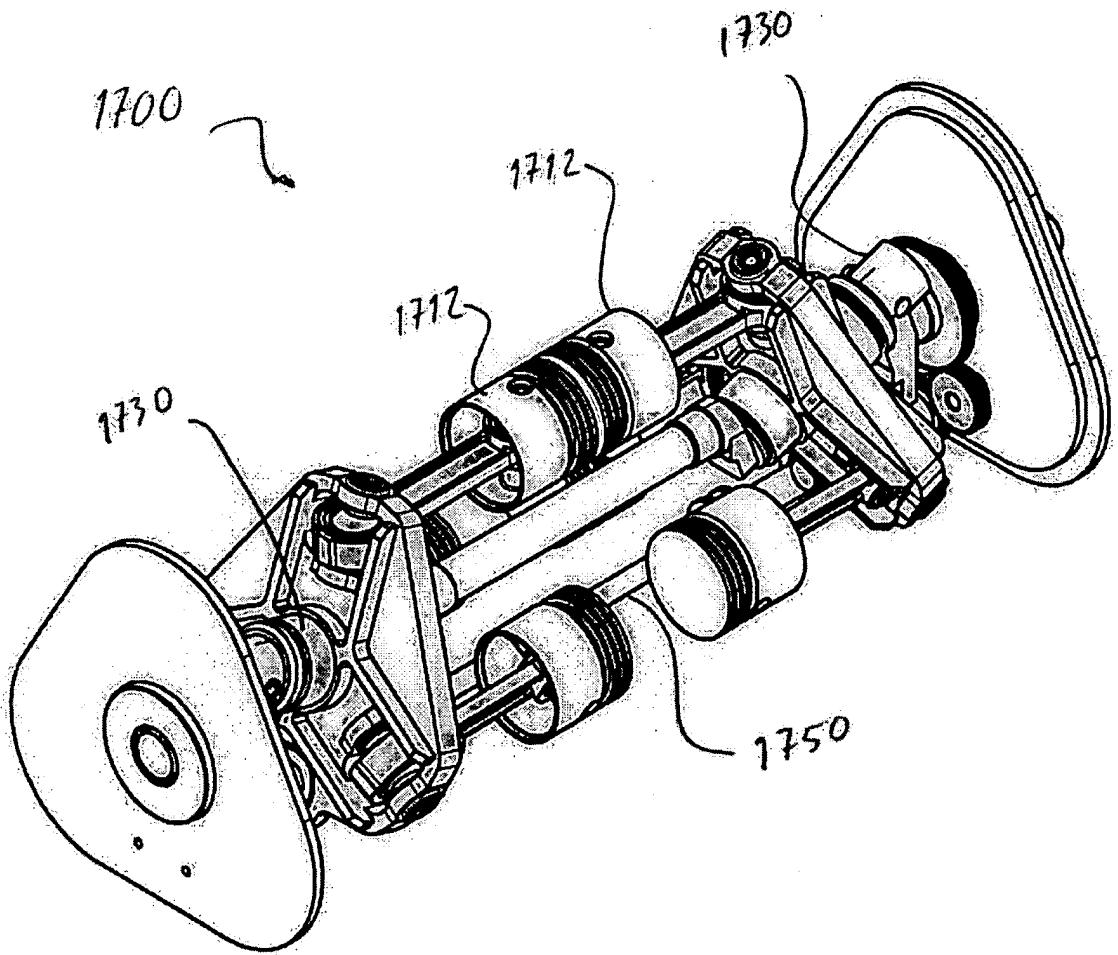
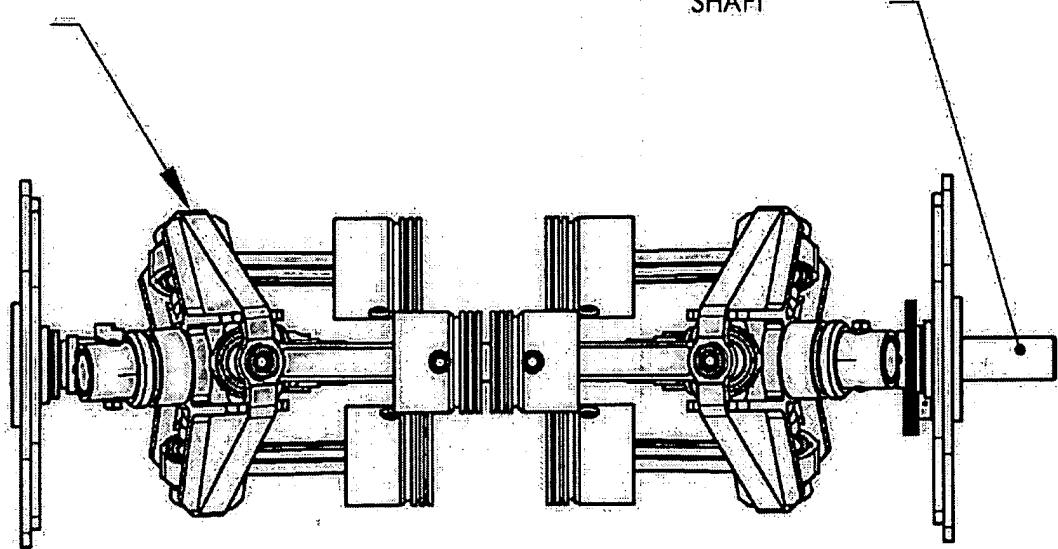


FIG 17

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OPPOSED MOTION
CONVERTERS ARE
SLIGHTLY OUT
OF PHASE

POWER OUTPUT
SHAFT



OPPOSED PISTONS
SHARE CYLINDER BORE

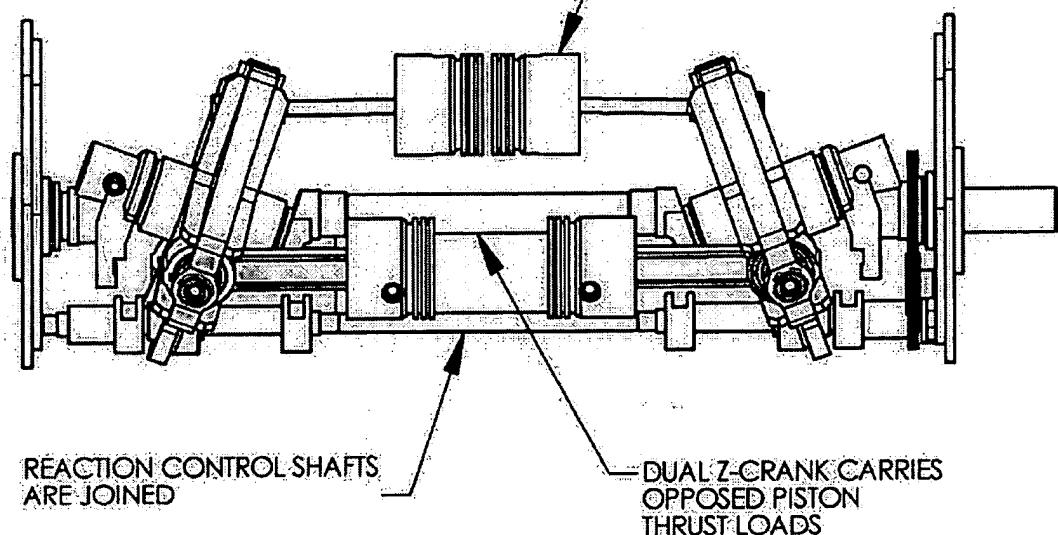


FIG 18

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